ENGINEERING OUTLOOK
AT THE UNIVERSITY OF ILLINOIS

RESEARCH
EDUCATION
PUBLIC SERVICE

UNIVERSITY OF ILLINOIS BULLETIN · COLLEGE OF ENGINEERING · ENGINEERING EXPERIMENT STATION VOL. 2, No. 8, OCTOBER 1961

UNIVERSITY OF ILLINOIS
LIBRARY
OCT 20 1961
CHICAGO

FALL ENROLLMENT FIGURES

Approximate registration figures for the fall term show the total University student population on the main campus at Urbana to be 23,000. The entire University registration, including the Chicago Undergraduate Division and the Chicago Professional Colleges, is now around 33,000. Of the Urbana total, approximately 3700 are registered as engineering undergraduates and 1200 as engineering graduate students.

The large graduate enrollment is primarily the result of the outstanding graduate education and research program at the U. of I. In the past seven years the number of doctorate degrees conferred by the University of Illinois in all engineering fields has been exceeded in total by only one other institution in the nation.

ENGINEERS, EDUCATION, AND ENCOURAGEMENTS

College teaching can pay an engineer almost as well as work in industry, and in either field a graduate degree is like money in the bank. These are two of the conclusions which can be drawn from a salary survey of U. of I. engineering graduates of 1956 recently made by the College of Engineering placement office.

The survey covered only people who received B.S. degrees five years ago. Of the people surveyed, those who now have advanced degrees have earned them since 1956. Nevertheless the survey showed that the attainment of an advanced degree is still a good investment in time and money. In spite of being in graduate school rather than on full-time jobs for three or four years, the men who have earned Ph.D.'s since 1956 are now earning over $200 more per month than men in the same areas of work who stopped their education with bachelor's degrees.

It shows the over-all average monthly salary of the graduates of 1956 to be $747.39; while the average for the college teachers involved was $723.12, and none of them had yet reached a rank higher than assistant professor. The teachers, who have all taken graduate study during these years, have less "time on the job" than the others surveyed. It looks as if engineers in the future will receive more encouragements to go into the teaching profession than the traditional "satisfaction involved in helping shape the minds of the young."

$82,000 GRANT FOR POLLUTION STUDIES

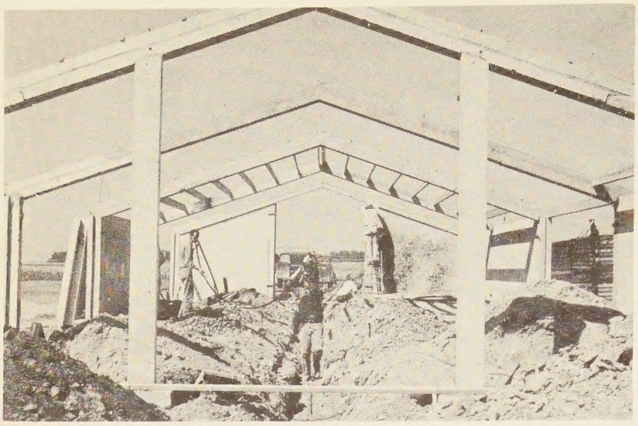
Professor John E. Pearson of the General Engineering Department has been awarded an $82,000 grant for a three-year study related to air pollution problems from the National Institutes of Health, U. S. Public Health Service.

The study, to be administered by the Department of General Engineering, will concern the rate of transfer of radon gas from the ground into the atmosphere. Radon, a radioactive gas caused by the decay of the small amounts of radium in nearly all soils, may be used as a tracer to give information about materials in the atmosphere which cause air pollution.

Such a study is important because some of the material in the atmosphere comes from automobile exhausts, and this problem is becoming acute as cities grow along the highways. "Strip cities," such as the one growing between Boston and Washington, D. C., are faced with serious air pollution problems.

The University of Illinois study will consist of measuring the radon as it comes out of the soil. Measurements will be taken in various parts of Illinois and elsewhere in the Midwest. Comparisons will be made of the rate it comes from equal areas in different locations at different times of year.

Professor Pearson, who holds degrees in mechanical engineering and meteorology, has done similar work for Argonne National Laboratories in Argonne, Illinois. He will be working with Argonne on a cooperative basis as this project develops.



Here a structure is being erected by agricultural engineers on the University farm from precast concrete footings, rigid frames, and wall panels with expanded polystyrene cores for insulation. The frames are made in three parts and bolted at a scarf joint located at a point of theoretical zero moment. Such precast concrete building frames can provide interiors free of supports, trusses, and braces like the lumber rigid frames described in the June, 1961, *Engineering Outlook*. A complete research report will be announced in these pages when it is available for distribution.

ENGINEERING RESEARCH IN THE 60'S

Research in U.S. engineering colleges should triple in the 1960's, if research keeps pace with graduate study. This was the prediction of Ross J. Martin, Director of the Engineering Experiment Station of the University of Illinois, speaking on September 5 to the Second International Conference on Fundamental Research on Plain Concrete.

Professor Martin predicted to the 100 conference participants from seven countries that "the next ten years will see a growth from the current rate of $130,000,000 per year to approximately $400,000,000 per year" in U. S. engineering college research.

In making his prediction, Martin cited figures showing a correlation between number and levels of graduate degrees awarded and dollar volume of research in engineering schools. Since research by both faculty and students is a vital part of graduate education, the correlation can be expected to continue.

Commenting on industry's role, Martin said, "Over the past ten years direct research support from industry has remained essentially constant while that of government has more than tripled. If this process takes place again over the next ten-year period, we will find an even smaller percent of industry support and a greater dominance of government support in our research sponsorship — already representing 85 percent of sponsored research support. Industry is losing a fine opportunity to keep in direct touch with our professors and graduate students by failing to carry their normal share of engineering college research support."

Martin said that government, on the other hand, has moved vigorously into university research sponsorship. "And while our relationship with government has not been entirely free from occasional attempts at benevolent dictatorship, the pattern of cooperation has in general provided full freedom of the university to conduct a productive program of high quality research."

Martin's remarks were made in his welcoming address as the Second International Conference on Fundamental Research in Plain Concrete began at the University's Robert Allerton House conference center. This four-day conference, like the first conference at Illinois in 1958, not only presented results of research but also discussed current technical knowledge in related scientific fields pertinent to the study of concrete.

Participants included men in physical chemistry, physics, geology, petrography, and rheology, as well as engineers. The meeting was supported by the National Science Foundation and sponsored by the American Society of Civil Engineers, the American Concrete Institute, the Reinforced Concrete Research Council, the Portland Cement Association, the American Society for Testing Materials, and the University of Illinois.

NEW EDITOR FOR STATION

Paul T. Bryant, editor of the *Journal of Engineering Education* and assistant editor for the Engineering Experiment Station since 1958, was named editor for the Engineering Experiment Station at the beginning of the current academic year. He succeeds Professor E. C. McClintock, who has moved to full-time teaching duties in the technical writing program of the Department of General Engineering. Bryant will continue as editor of the *Journal of Engineering Education*, the official publication of the American Society for Engineering Education. ASEE has it national headquarters on the U. of I. campus.

ENGINEERING CAREERS BOOKLET

The sixth edition of *Careers in Engineering*, a guide for people considering enrollment in engineering school, has just been published. It describes the various areas of engineering, the kinds of engineering positions, and the objectives of the engineers' college education. It lists the departments of the U. of I. Engineering College and gives information about the work and programs of study in each. The booklet also contains material about various facilities, honor societies, and extracurricular activities available on the U. of I. campus. It is available, free of charge, from Engineering Publications, 112 Civil Engineering Hall, University of Illinois, Urbana.

WHY DOES A CULVERT CROSS THE ROAD?

Each year over one billion dollars is spent on the construction of culverts and these unobtrusive structures take 15 to 25 percent of the highway maintenance dollar. In fact, there are so many culverts in modern highway construction that their total construction cost exceeds the total costs of large bridges.

Culverts cross the road, of course, to get water to the other side — and they must be the proper size to do the job. If too big, they raise costs. If too small, they cause floods. Determining this size is a complex problem. It involves such uncertainties as the amount of rainfall and various types of soils and their runoff conditions. In the past the engineer had to make such decisions from his own judgment based on past experience. Now a method of determining culvert sizes which minimizes such "educated guessing" has been developed by Professor Ven Te Chow of the U. of I. Civil Engineering Department.

The method was described by Professor Chow in a talk before the 10th annual Hydraulics Conference of the American Society of Civil Engineers on the Urbana campus in August. The new method is primarily based on scientific knowledge of the water runoff speed on various types of soils and other surfaces. This information has been put into a design chart for easy use by engineers. Professor Chow's method will have many advantages over the Talbot Formula, a method currently used for most present culvert computations and proposed 74 years ago by another U. of I. professor, A. N. Talbot. The new method promises great savings in highway and maintenance costs, as well as in farm drainage programs and flood protection work.

Professor Chow's talk will be reprinted in the *Journal of Hydraulics Division, Proceedings of the American Society of Engineers.* The entire theory, including supporting data, pertinent hydrological information, design charts, and two bibliographies, is in the process of publication as an Engineering Experiment Station bulletin.

THE ENGINEERING ALUMNI COMMITTEE

The activities of the U. of I. Engineering Alumni Committee are getting a boost this fall by the addition of eight new members, seven from Illinois and one from Indiana. They are C. P. Atkins, Champaign; A. R. Ayers, Bement; G. L. Crawford, Collinsville; J. W. Haas, Pittsfield; C. J. Laegeler, Libertyville; H. Roffmann, Salem; G. K. Wineland, Peoria; and E. A. Koertge, Indianapolis, Indiana.

The Engineering Alumni Committee is a group of engineers who voluntarily work with secondary school administrators and teachers in telling students about career opportunities in engineering. It is not the Committee's purpose to recruit students for the University of Illinois, but rather to provide the best counsel to graduating seniors who are qualified to enter the engineering profession.

The annual Alumni Committee meeting this year will take place November 3 and 4 on the Urbana campus. In addition to other topics to be discussed, the members will be given information on the policies and future plans of the Junior Engineering Technical Society (see *Engineering Outlook,* Sept., 1961). As this program develops, the Committee will work closely with the JETS organization in a coordinated program of career information for prospective college students.

FALLOUT SHELTER STUDY

Thousands of public buildings in this country could be used as shelters in the event of nuclear attack, but no evaluation has yet been made to determine which ones could withstand radiation and blast damage. The Department of Defense has announced that such a selection will be undertaken as soon as enough engineers can be hired and trained to do it. Due partly to the past studies of nuclear blast resistant structures of the U. of I. Civil Engineering Department, the U. of I. has been chosen as one of the schools to teach engineers how to make such evaluations.

The first of seven two-week short courses started on October 9, 1961. Altogether there will be 200 to 250 trainees, architects, and engineers selected from various firms from several midwestern states. The selections are made by the Division Engineer of the Corps of Engineers, North Central Division, Chicago, Illinois. Mr. J. T. Hanley of the Civil Engineering Department, who has attended a pilot course at Fort Belvoir, Virginia, is in charge of the program at the U. of I.

A GUILD OF SCHOLARS

Medieval guilds brought together highly skilled and expert craftsmen for mutual protection, aid, and advancement of artistic skills. The early guilds fostered a spirit of excellence that continues to be felt today in all fields where superior accomplishment is sought. At the University of Illinois a modernized guild is now in operation.

The Center for Advanced Study was established for "the encouragement of creative achievement and scholarship by providing recognition to scholars of the highest distinction and by providing incentives for the highest level of scholarly achievement." Created by the U. of I. Board of Trustees in the spring of 1959, the Center consists of individuals who are considered by the University President and the Board to be worthy of special recognition for their study and research. The U. of I. program allows the distinguished scholars admitted to membership to continue in their creative pursuits by having their academic work loads reduced so that they can participate more fully in basic study and research. By offering membership to the most distinguished, most productive, and most widely recognized scholars, the Center helps to keep good faculty members from leaving to work in industry, other universities, or from being channeled into administrative positions where their contributions to higher study and research would be restricted. The Center also helps the University in its continuing efforts to attract outstanding scholars from other institutions to the U. of I.

Two types of membership are conferred by the Center: Member and Associate Member. Members are appointed for renewable five-year terms and receive salaries "comparable to the best professorial salaries in American universities." They retain their departmental affiliation and no change in their duties is required by the Center. However, it is possible for Members to have their teaching loads reduced so that they can participate more fully in basic study and research. Associate Members are appointed for varying periods and may be freed of part or all of their teaching duties except as directors of graduate theses.

Dr. John Bardeen, Nobel Prize winning physicist and a member of the College of Engineering faculty, who himself is a Member of the Center, said in a recent speech: "The Center for Advanced Study helps the University in attracting and keeping an outstanding graduate faculty and in future years should play an increasingly important role in the University."

In addition to Dr. Bardeen, Professor of Electrical Engineering and of Physics, other outstanding and world famous scholars admitted to select membership in the Center include: Dr. Joseph L. Doob, Professor of Mathematics who is well known for his work in the theory of probability, Dr. Reynold C. Fuson, Professor of Chemistry who has made many important contributions to theoretical organic chemistry, and Dr. Julian H. Steward, Research Professor of Anthropology who is noted for his research on Indian cultures and his development of cultural change theory. Among the Associate Members elected for 1961-62 are Prof. D. E. Mapother of the Department of Physics and Prof. A. S. Veletsos of the Department of Civil Engineering.

The Center presently consists of these four full members and ten associate members named for the 1961-62 academic year. A special unit of the Graduate College of the U. of I., the Center is now in its second year of operation. Through its pioneering efforts it has already helped to carry on the tradition of excellence first achieved by the early medieval guilds.

ENGINEERING OUTLOOK is published ten times a year by Engineering Publications, 112 Civil Engineering Hall, University of Illinois, Urbana. Subscriptions without cost are available upon written request. Material may be reproduced without permission, although credit to the source is appreciated. *Engineering Outlook* Editor: R. Alan Kingery. Engineering Experiment Station Editor: Paul T. Bryant. Director of the Engineering Experiment Station: Ross J. Martin. Dean of the College of Engineering: William L. Everitt.

UNIVERSITY OF ILLINOIS BULLETIN
Volume 59, Number 15; September, 1961. Published nine times each month by the University of Illinois. Entered as second-class matter December 11, 1912, at the post office at Urbana, Illinois, under the Act of August 24, 1912. Office of Publication, 49 Administration Building (West), Urbana, Illinois.

VOL. 2, No. 8, OCTOBER 1961

SERIALS CLERK, U. OF I. LIBRARY
CHICAGO UNDERGRADUATE DIV.
NAVY PIER
CHICAGO 11, ILL.

NTF

ENGINEERING OUTLOOK
112 CIVIL ENGINEERING HALL
UNIVERSITY OF ILLINOIS · URBANA

SECOND CLASS
POSTAGE PAID AT
URBANA, ILLINOIS